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ABSTRACT

The overall purpose of this study was the investigation of the singing abilities of kindergarten and first grade children. Information was sought concerning the following: (1) the maximum singing range of preschool children compared to that of first grade children, (2) the range within which accurate singing could be expected from the majority of kindergarten and first grade children, (3) the relative ease with which most children hear and vocally reproduce comparable major and minor melodies, and (4) the developmental stages in musical growth evidenced by kindergarten and first grade children. Related research is reviewed. The present study was conducted in two cities. The criterion test, administered as a game, was given individually to each child. Each item of the test was played on a sing bell by the examiner, then sung by the examiner. The examiner then asked the child to sing the item. The entire test was recorded on magnetic tape for later evaluation. Results include: (1) The child in this stage of development habitually uses his speaking voice instead of his singing voice; (2) The child will normally sing in a vocal quality, but will not consistently perform the correct melodic direction; (3) There are two types of singers: the one who sings at the proper pitch level but evidences intonation problems, and the one who transposes the entire melody to another key; and (4) The child will sing most of the melody accurately. It is concluded that girls possess lower pitched voices than boys and blacks lower than whites and that white children have a wider singing range than comparable black children. (CK)

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AN INVESTIGATION OF THE SINGING ABILITIES OF KINDERGARTEN AND FIRST GRADE CHILDREN IN EAST TEXAS

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PS 006178

August 1971

Nacogdoches, Texas

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This investigation was completed under the auspices of the Stephen F. Austin State University Faculty Research Council, Dr. J. N. Gerber, Chairman.

ACKNOWLEDGEMENTS

It should be noted that, of the initial group of seven schools contacted in regard to their willingness to participate in this project, all unanimously expressed a desire to cooperate. This is certainly a tribute to the forward looking attitude and the interest displayed in the search for new knowledge on the part of the teachers and administrators of these schools:

Raguet Elementary School, Nacogdoches,Texas

Brooks-Quinn-Jones Elementary School, Nacogdoches, Texas

Cushing Elementary School, Cushing, Texas

First Methodist Kindergarten, Nacogdoches, Texas

First Baptist Kindergarten, Nacogdoches, Texas

SFA State University Kindergarten, Nacogdoches, Texas

Headstart School, Mt. Enterprise, Texas

PREFACE

The first public school system in the United States to offer music as a part of the regular curriculum was Boston, Mass. in the year 1838. Within twenty years, the practice had generally spread across the nation so that by 1860, many schools offered some music instruction in all grades. This situation has remained relatively stable, and, to the present time, music is commonly taught in most schools.

While the majority of schools have continued to provide time in the schedule for music classes, the place of music in the curriculum has never been secure. Through the decades, opponents have maintained that music was a "frill," a pleasant pasttime, useful primarily for recreation or to provide a break in the school day. Others, while conceding that music was "important" to the overall development of children, insisted that it be regarded as "extra-curricular," thus attaching a second class status to it.

This failure to clearly establish music as a worthwhile school subject has led to many abuses. Administrators have often been satisfied to fill music teacher vacancies with people, who were perhaps competent musicians, but who were inadequately prepared to teach elementary age children. In some situations, classes were held in gymnasiums, lunchrooms, and other less than satisfactory areas. In still others, equipment was make-shift, or obsolete.

Fortunately, progress has been made in recent years, and continues to be made, toward the elimination of these and other deficiencies. In many instances, however, the attitude of school administrators, as well as that of a large segment of the public in general, has remained adement. Music is still regarded by some as "nice but not essential;" "beneficial but not important."

This lethargy on the part of so many has been a subject of deep concern to music educators for many years, but only within the past decade has it become of primary importance. The reason for this change is the ever increasing tax demands of education combined with a growing reluctance on the part of the tax-payor to provide the funds requested. The result has been the necessity for finding areas in which costs can be substantially reduced. It follows that the most logical places to cut-back or eliminate are to be found among those subjects considered to be least important in the education of children. As of now, a prime target is public school music.

The question thus arises, after more than 130 years of music instruction in our schools, why do so many people fail to see its value for the children of today? There is no simple answer. It is obvious, however, that by far the largest share of the credit (or the blame)is directly due the public school music teacher. An alarmingly substantial segment of the music teaching profession is

unable to answer when asked what values music holds for the children in their classes. Many others repeat such time-worn phrases as "music builds character, it teaches children to work together, it improves posture, maintains health, keeps them off the streets," or, "it develops citizenship." Still others assert that the music program teaches children to "love" music. If the latter is true, then the logical conclusion is that we have failed, if one may judge by the amount of interest displayed by the public in the kind of music taught in most of our schools.

Any valid arguement for a public school music program must be based primarily on the music itself. In short, the value of music <u>is</u> music. This, of course, is not sufficiently convincing for the typical layman. He demands more specific information.

Probably the most apparent value of music instruction (the one which is most easily recognized) is in the realm of the vocational. For some students, music is a form of vocational training just as much as agriculture, shop, home economics, typing, and similar subjects are for others. These students will go on to become professional musicians, teachers, ministers of music, or one of the fifty other musically oriented vocations listed by the U.S.Department of Labor.(1) For these people, music is a vocation - a professional career. For hosts of others, who may sing in church choirs, play Saturday night dances,or otherwise participate occasionally in music activities, it serves as an avocation.

But what of the large majority of students passing through our schools who may never actively participate in music during their adult lives? What value does our public school music program hold for them?

The primary benefit for these students, as has been often stated, is the development of esthetic judgment. Another, perhaps overworked,term for this is music appreciation. Appreciation should not be confused with liking music. It is quite possible to fully appreciate a musical selection without liking it. Appreciation is, rather, an ability to make intelligent decisions regarding the musical values of all types of music. There is good and bad in all music, whether it be rock, jazz, country, or serious. If music is to be any more than a mere contributor to the general noise level in the background of our lives, children must be taught to make value judgments concerning the music to which they wish to listen.

The development of this ability depends to a large extent on the amount of knowledge and understanding of music which the student is able to acquire in school. One usually has more understanding of that with which he has had the most experience and, in like manner, he most often appreciates that about which he has the most knowledge. Thus, it behooves the music teacher to provide the maximum experience possible with all types of music and to enlarge the individual's knowledge and understanding of music in general. It goes without saying that a person who possesses

extensive experience with various kinds of music, along with some ability to manipulate the tools of music (that is, read and write) is far better equipped to make intelligent musical judgments than those persons who lack these attributes.

A second value the music program holds for all students is in the cultural area. Our American culture consists of a combination of elements derived from the cultures of other peoples plus many features developed indigenously. Probably one of the most "American" facets of our musical culture is jazz: a combination of European harmonies and African rhythm patterns, developed and refined by American musicians from the late 19th century to the present. In addition to the several kinds of music which have emerged from within the U.S. culture, that music which was a part of the various cultures from which our citizens emigrated (much of which is still in use and therefore forms a part of the total U.S. culture) should be a part of our public school program. The latter includes both serious and folk music from the various peoples of Europe, Asia, Africa, and America.

A school music program which develops the esthetic judgment of the student; awakens him to the cultural heritege of his nation and the people who live in it; and provides sufficient background knowledge and skills of a specific nature to allow him to intelligently select, or reject, music as an avocational or vocational pursuit, is indeed, a valuable asset to the community. A program such as this must necessarily be an integral part of the school curriculum!

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PART ONE: INTRODUCTION

An area receiving considerable emphasis today is early childhood education. Within the past decade, educators have become increasingly aware of the necessity for beginning formal instruction at an age earlier than that at which the child normally enters elementary school. This awareness has resulted in the establishment of numerous early childhood education programs to replace "nursery" schools and "play" schools.

The idea of beginning music instruction at an early age is not new to music educators. Over the past quarter century, leading music educators such as Carl Orff, Zoltan Kodály, Sinichi Suzuki, and others, have advocated starting music instruction as early as possible. While the early childhood concept is certainly not new, there is still much to be learned in this area. The initial singing abilities of young children, their developmental characteristics, types of materials needed, and the most effective techniques for preschool use are just some of the areas about which more information is needed.

Purpose of the Study

There are two activities which are basic to any effective preschool music program. The first, generally described as the listening program, consists of providing experiences for the children

with types of music which they are unable to reproduce themselves. Music requiring instruments the children cannot play, stylized performances, or music encompassing a wider range than the children are capable of singing would be included in this category. The second is sometimes termed 'reading readiness' and involves participation in musical activities of a progressively more difficult nature designed to lead the children toward music literacy. This music, which the children produce in the classroom themselves also includes several aspects, probably the most fundamental of which is singing. In order to develop the ability to read and write music, the child must first be taught to hear, identify, and reproduce it with accuracy. Classroom singing is the most logical medium, although by all means not the only one, for this reproduction.

The overall purpose of this study was the investigation of the singing abilities of kindergarten and first grade children. Specifically, information was sought concerning the following:

(1) The maximum singing range of preschool children compared to that of first grade children.

(2) The range within which accurate singing could be expected from the majority of kindergarten and first grade children.

(3) The relative ease with which most children hear and vocally reproduce comparable major and minor melodies.

(4) The developmental stages in musical growth evidenced by kindergarten and first grade children.

Related Research

The vocal singing range of children has been investigated on a number of occasions. As early as 1909, Gutzmann-Flateau reported the singing range of three, four, and five year olds to be e to a'. Later, in 1920, Froschels found that four year olds sang from middle c to g# and five year olds from middle c to a'.

One of the earlier American investigations of this type was that of Jersild and Bienstock (1931).[2] These investigators tested an initial sample of 48 children ranging in age from 31 to 48 months. They found that the maximum range of this group included eleven diatonic tones from middle c to f'. However, only six of these, ranging from middle c to a', were reproduced by forty percent or more of the children. Various investigators have reaffirmed this range as being the most commonly produced, with accuracy, by young children.

A recent study, employing a sample of 128 preschool children from advantaged and disdavantaged environments indicated that the accurate singing range of these children centered on first space f and extended upward no farther than g#.[3] Many textbook writers have also quoted initial singing ranges for young children, usually based on their research, experience, or both. Among these are Smith[4], c to a'; Garretson[5], (e to b'); Nye & Nye[6], (c to a'); and Gordon[7], (d to a'). On the basis of these several sources, it may be generalized that the vocal singing range of most preschool children

lies in the area of middle c to a' above. Illustration One summarizes these findings.

One of the stated purposes of this investigation was to obtain information relative to the facility displayed by children in singing comparable major and minor melodies. This portion of the study was prompted by information derived from a previous study.(3) In that study, the Hill Primary Music Ability Test was employed to determine the music achievement of preschool children. Section Two of the Hill test contained ten tonal patterns. Of these, three major patterns were identical to three corresponding minor patterns, with the exception of tonality. Results indicated that, in each instance, more children seemed able to accurately sing the minor version than the comparable major pattern. These findings led to the tentative conclusion that "... children may be able to sing more easily in minor tonalities than in major."

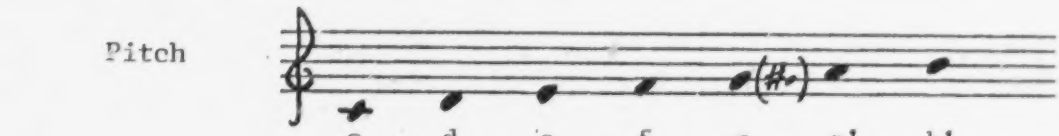
Procedures

The present study was conducted in the cities of Nacogdoches, Cushing, and Mt. Enterprise, Texas. A total of two hundred children were included in the study: one hundred from the kindergarten level, and one hundred from the first grade level. Seven schools containing a total of thirteen classrooms participated. Children from a wide variety of home environments ranging from disadvantaged to affluent were involved.

It was not the original intention of this study to investigate

ILLUSTRATION ONE

VOICE RANGE OF PRESCHOOL CHILDREN
ACCORDING TO SEVEN AUTHORITIES



Gutzmann--Flateau (1909)	e to a'
Froschels (1920)	c to g#
Jersild--Bienstock (1931)	c to a'
Garretson (1966)	e to b'
Nye-Nye (1970)	c to a'
Smith (1970)	c to a'
Gordon (1971)	d to a'

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children's singing abilities in reference to ethnic origin, however, the data profiles suggested marked differences in voice range characteristics between black and white children. Therefore, the data for the children employed in the study were classified according to racial origin, sex, and grade level. This information is summarized in Illustration Two. No effort was made during the the testing period to control the numbers within each classification, thus, the figures shown are as they randomly occurred. Because of the unequal distribution of the children in the various groupings, many of the results appearing in later sections are presented in the form of percentages of the total.

Test Administration Procedures

The criterion test was administered individually to each child. The examiner introduced the test as a "game" which he would like to play with the child. The child was also told at the beginning of the test that he or she would receive a candy treat when the test was completed. This proved to be a strong motivational technique and there were few incomplete tests.

Each item of the test was played on a song bell set by the examiner, then sung by the examiner. In this manner the child had two opportunities to hear the item. The examiner then asked the child to sing the item. This sequence was repeated for each item.

The entire test, including the examiner's presentations was

ILLUSTRATION TWO

DISTRIBUTION OF THE SAMPLE POPULATION
CLASSIFIED ACCORDING TO SEX, RACIAL ORIGIN, AND GRADE

	Boys	Girls
Black	Kg. = 13 1st = 19	Kg. = 17 1st = 17
White	Kg. = 36 1st = 28	Kg. = 35 1st = 36

recorded on magnetic tape for later evaluation. The children's best response for each item was recorded and the other disregarded. Testing time varied for each child but usually consumed six to ten minutes. This time span seemed to function well from the standpoint of the maturity level of each child and their attention span.

Tests were administered in May of 1971 and tape response evaluation was accomplished during the following summer.

Description of the Test

A copy of the test, as given, is displayed as Illustration Three. A total of twenty-three items were included in the test. The test was constructed in two parts; that designed to measure total voice range, and that designed to measure singing ability and tonality preference. The items included within each of the parts are shown:

Part One - Vocal Singing Range Test

A. (Items 1 through 7) Unfamiliar melodic segments

B. (Item 8) Familiar song phrase in key of child's choice.

C. (Items 21 through 23) Familiar song phrases in keys of examiner's choice

Part Two - Singing ability and Tonality Preference

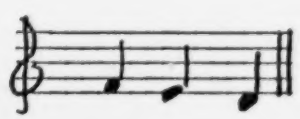
A. (Items 9,16,11,18,13,20) Minor melodies

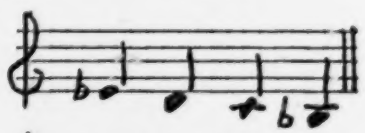
B. (Items 15,10,17,12,19,14) Major melodies

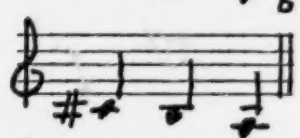
ILLUSTRATION THREE

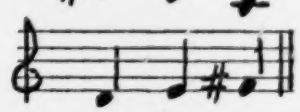
THE CRITERION TEST

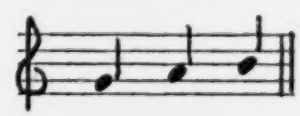
Part I-A

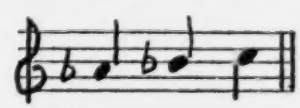
1. 

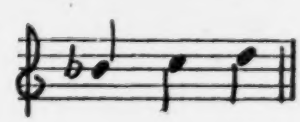
2. 

3. 

4. 

5. 

6. 

7. 

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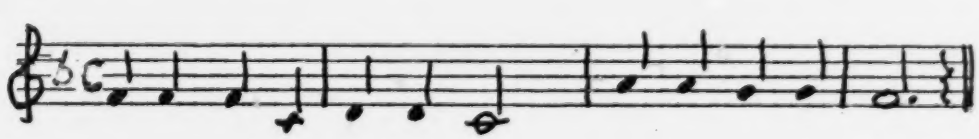
Part I-B

First phrase of "Old MacDonald had a Farm" - key of child's choice

8. 

(Presented in F-major, for reference only)

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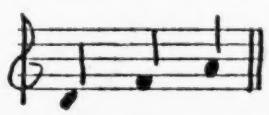
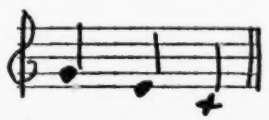
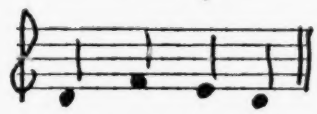
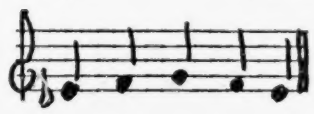
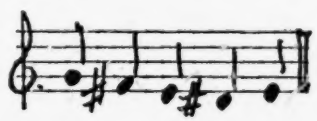
Part II

9. 

10. 

11. 

12. 

13. 

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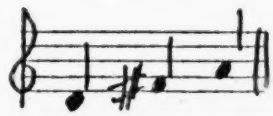
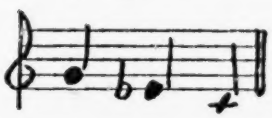
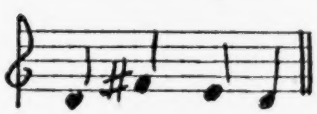
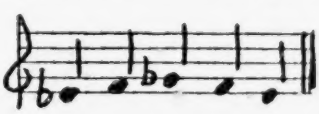
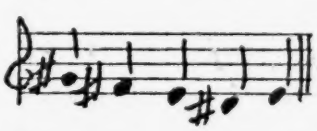
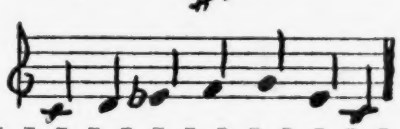
15. 

16. 

17. 

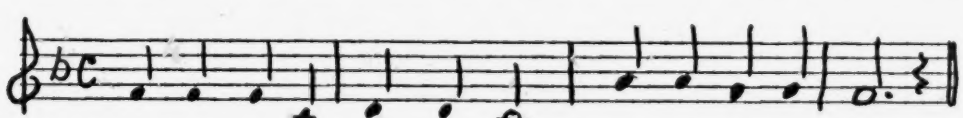
18. 

19. 

20. 

Part I-C

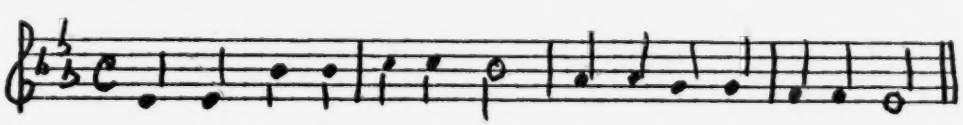
First phrase of "Old MacDonald had a Farm" - Key of F major

21. 

First phrase of "Old MacDonald had a Farm" - Key of E-flat

22.

First phrase of "Twinkle twinkle little star" - Key of E-flat

23. 

Test Rationale

It was desired to begin the test with a melodic segment most easily sung by the majority of the subjects. The descending minor third (plus an extra pitch between) was selected. Both Carl Orff and Zoltan Kodaly, two of the foremost music educators of our time, have reported the minor third to be the most "singable." (3) This fact was substantiated by the writer's own research. The pitch level selected for this item was also determined by the research mentioned and was within that believed most easily sung by the majority of children. These pitches are also within the center of the range described by most authorities as the best singing tessatura for preschool children. (See Pp. 3-5)

Items two and three were designed to determine the lower limits of each child's voice range and extended to b-flat and a respectively. Item four was included in order to provide an easy melody, again in the "best" singing range, and to facilitate the transition from the lower range to the upper. Items 5,6, and 7 extended increasingly upward in pitch and were intended to determine the children's upper singing limit. The highest pitch in this latter sequence was d'.

Items one through seven, together, required the child to sing all chromatic tones between a (two leger lines below the treble staff) and c' (third space), plus the whole step to d'. Provided the child was assisted in every way to reach these pitches, it was assumed that his maximum possible singing range would be adequately determined.

To respond correctly to items 1-7, the children's musical

perception would have to function to some degree. In order to reduce the influence of this factor, each child was asked to sing item 8 (Old MacDonald) at the pitch level of his choice. In two instances, the children did not know this song and were allowed to substitute one of their own choosing, which was "Jingle Bells" in both cases. A satisfactory response to item 8 could be assumed to lie near the center of the child's most comfortable pitch range, and, eliminate the factor of musical perception, since he was not asked to apprehend a strange melody.

In order to further determine each child's voice range, items 21 and 22 again required the child to sing the initial phrase of "Old MacDonald" with the added provision that he start on the pitch given by the examiner. Item 21 required a beginning pitch of f which resulted in a total range of c to a'. Item 22 asked the child to begin on e-flat with a total range of b-flat to g. Item 23 asked the child to sing the first line of "Twinkle, twinkle" beginning on the pitch e-flat. The resulting range in this case was e-flat (the beginning pitch) up to c'. By requiring the child to sing at a specified pitch range, a second estimate of the total voice range resulted. It will be noted that these three tunes (items 21,22, & 23) encompassed almost the identical range as items one through seven.

Part Two of the test contained twelve items numbered 9 through 20. These melodic segments were constructed in pairs identical in every respect with the exception one was in minor tonality and the other in major. The most comfortable singing range, as recommended

by most authorities, was selected for these items in order to reduce the effect of any extraneous factors which might present themselves due to extremes in pitch. As discussed on page four, data from a previous study had supported the tentative assumption that preschool children sang more easily in minor tonality than in major. If this assumption would be born out by subsequent research, it would have far-reaching ramifications in our elementary programs.

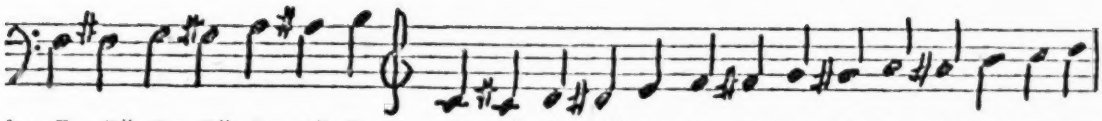
..

PART TWO: RESULTS

The Child Voice Range

Each child's total possible voice range was determined from his efforts to sing items one through seven. These items combined all chromatic tones between low a and third space c', plus a whole step to d'. Although many children were unable to sing all of these pitches, they were, nevertheless, asked to sing all the items. Each child was then credited with the pitch he produced regardless of the pitch of the criterion. In this manner, his possible range was determined since in most cases the children were producing their highest and lowest pitches.

The data for this portion of the test are presented in Illustrations Four, for kindergarten children and Five, for first graders. In order to determine if there were any differences between the voices of boys and girls and between the voices of black



Pitch: F F# G G# A A# B C C# D D# E F F# G G# A A# B C D

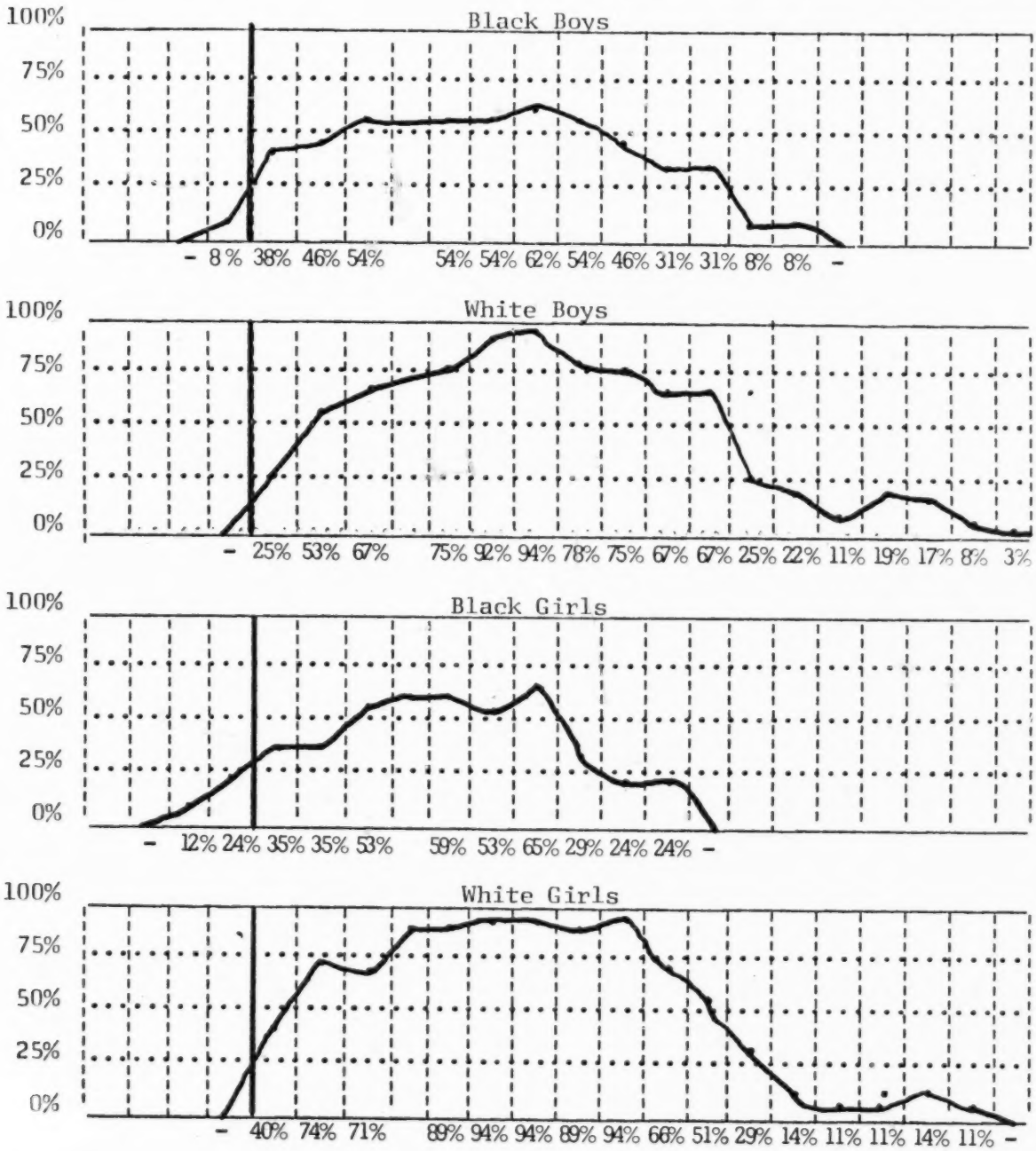
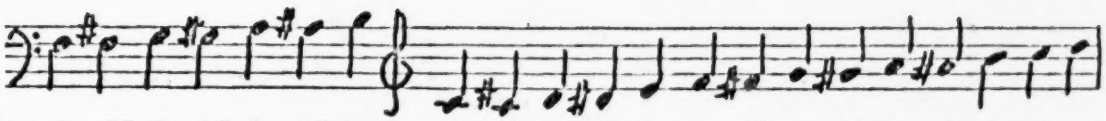


ILLUSTRATION FOUR

MAXIMUM VOCAL RANGES OF KINDERGARTEN CHILDREN



Pitch: F F# G G# A A# B C C# D D# E F F# G G# A A# B C D

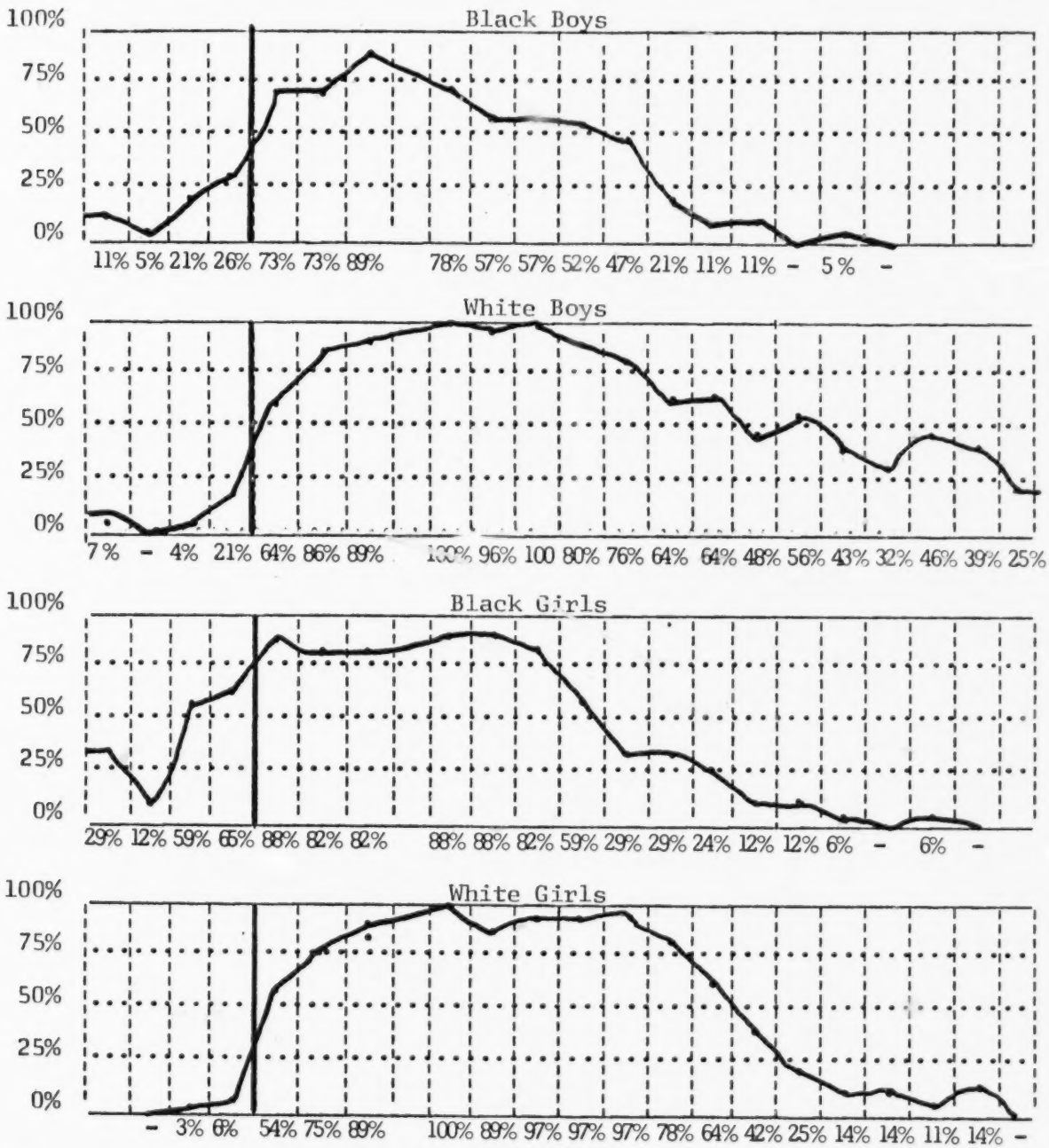


ILLUSTRATION FIVE

MAXIMUM VOCAL RANGES OF FIRST GRADE CHILDREN

children compared to white, four separate categories are shown in each illustration. In many instances, the children responded with pitches lower than those in the criterion items, thus, the table extends to low F, the lowest pitch produced by any of the children. The heavy black line in the illustrations delineates the pitch a, the lower limit of the criterion test.

One of the most obvious differences apparent in the graphs is that black children, on the whole, seem to have lower pitched voices than do comparable aged white children. White kindergarten boys voices ranged to a high of fourth line d' while the voices of white girls extended to third space c'. In contrast, the voices of black boys extended only to a high of second line g# and black girls to first space f. On the other hand, while white boys reached low a, black boys reach low G#. In like manner, 12% of the black girls sang low G, while the lowest pitch produced by white girls was low a.

A second characteristic observed in kindergarten children was that black girls apparently had lower voices than black boys and white girls had lower voices than white boys. Not only did girls of both races sing lower than the boys but in larger percentages. For example, low a was produced by 40% of the white girls but by only 25% of the white boys. Similarly, 74% of the white girls sang low b-flat compared to just 51% of the white boys. Twelve percent of the black girls sang low G while none of the black boys reached this pitch. Low a-flat was produced by 24% of the black girls but by only 8% of the boys. Just why girls should have lower

pitched voices than boys is not readily apparent, however, since girls are more advanced in maturity than boys of the same age, it is not unusual that their voices should be different.

It will also be observed in Illustration Four that the middle range pitches were sung by a higher percentage of the white children than was true with black children. This difference was caused, in the main, by the individual voice ranges of the children. In general, the black children had more restricted voice ranges, that is, they sang fewer total pitches than their white counterparts. Many black children had ranges of only five tones or less while the range of the typical white child was from 9 to 12 chromatic tones. This difference is probably not attributable to racial characteristics. The black children attending kindergarten in this area were selected from disadvantaged homes while most of the white children came from homes possessing comparatively more advantages. This factor of environment, as has been shown in several studies, is highly correlated with with initial musical ability and probably accounts for much of the observed difference. (3) (8) (9) (10) (11)

The same characteristics, as discussed in regard to kindergarten voices were observable in first grade children. Black boys on the whole sang lower and in greater percentages than did comparable white boys while black girls for the most part exhibited lower voices than their white counterparts. White children, on the other hand, sang considerably higher than comparable black children and, again due to their more extensive total ranges, a larger percentage

of them sang the middle range pitches than was true of black children. Girls in general, still sang lower than boys but the differences were not as marked as they were with kindergarten children.

The Voice Break

A commonly mentioned phenomenon in young children is the "voice break." In the pitch vicinity of a' or b', many children are said to experience difficulty in controlling their voices. Above or below this area seems easier for children to sing. Many writers recommend the use of song literature which leaps over this difficult region or descends through it until such time as experience and maturity eliminate the problem. It is considered potentially harmful to the child voice to persistently employ this area of the voice, especially through the use of literature which approaches this area from the tonal regions immediately below. As the illustrations show, in the region g# to b', fewer children were able to produce these pitches than was the case with the pitches above and below.

Although black children seem to be able to sing lower than white, and white seem to be able to sing higher than black, there is still a region of common ability. It is doubtless within this common singing range that most elementary songs should be centered. For example, 50% of the black kindergarten boys sang in a range of b to e-flat; 50% of the white kindergarten boys b-flat to f-sharp.

Similarly, 50% of the black kindergarten girls sang b to d while 50% of the white kindergarten girls sang b-flat to f-sharp. Thus, if the teacher pitches the songs so that the tessatura (most frequently sung pitches) are in the b to d range, she can generally be assured that more than half of the children will be capable of singing the song. In first grade this common area produced by 50% or more of the children extends from low a to the e-flat above.

A practical example can be seen if one considers the song "When the Saints Go Marchin' In." This song encompasses a range of a fifth. If, as is often done, the song is pitched in the key of F major, the resulting range would be f to c'. At this pitch level, none of the black children in either kindergarten or first grade and only a small proportion of the white children could sing all the pitches in the song. If the song were pitched in C major, some of the children from all groups in the first grade could sing the song but it would still be inappropriate for kindergarten. If, however, the song were pitched in A major or B-flat major, the largest proportion of all children could sing the song resulting in the greatest number of children achieving success.

Although the foregoing example used the information from the illustrations literally, it should be remembered that a common characteristic of young children is their great day to day variability. While the information presented in Illustrations Four and Five may well be true of the day the children were tested,

it may be that, on a different day, or with a different examiner, some of the children might display greater or lesser singing ranges than those shown. It can, however, be reasonably assumed that the general range and comparative frequency are as shown in the illustrations.

The Accurate Voice Range

In the previous section, each child's voice range was examined from the standpoint of what pitches he was able to produce, irrespective of the pitch he was attempting to sing. Of perhaps equal interest is the question of what pitches can be accurately reproduced by kindergarten and first grade children. To obtain this information, items one through seven were rescored. This time, each child was given credit only for those pitches which he was able to sing accurately. Accuracy, in this case, was defined as within a quarter-tone of the criterion pitch. These data are presented in Illustration Six for kindergarten children and in Illustration Seven for first grade pupils.

Of primary interest in this analysis was the pitch area within which most children sing with accuracy. It will be seen that this pitch area, for black kindergarten boys, extends from low a to e-flat. The accurate area for the greatest number of white kindergarten boys appeared to be from low b'flat to f-sharp above and for white kindergarten girls, the accurate range extended from a to f#. In all three instances, the range cited included the tones sung accurately by one-third, or more, of the children. In the

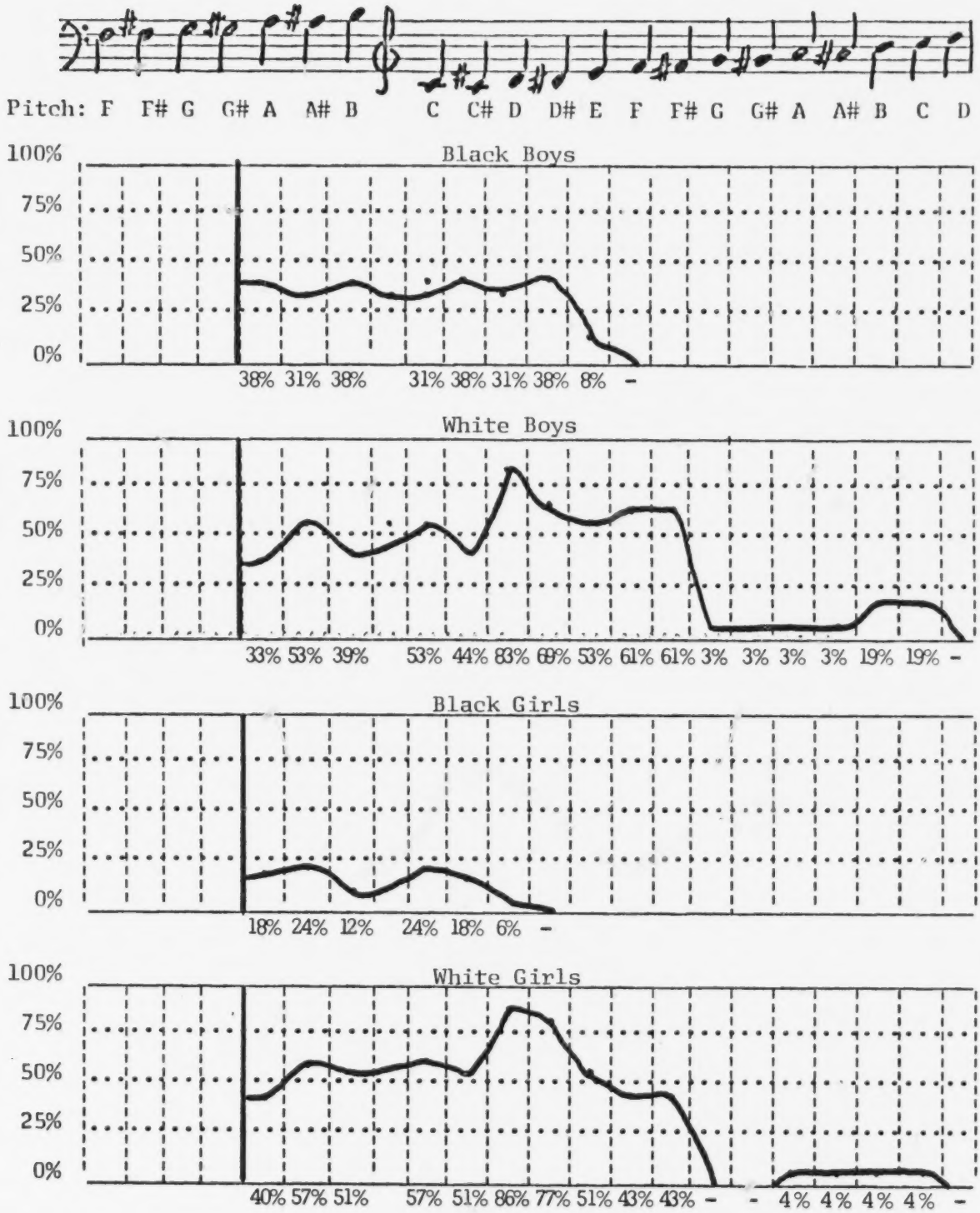


ILLUSTRATION SIX

ACCURATE VOCAL RANGE OF KINDERGARTEN CHILDREN

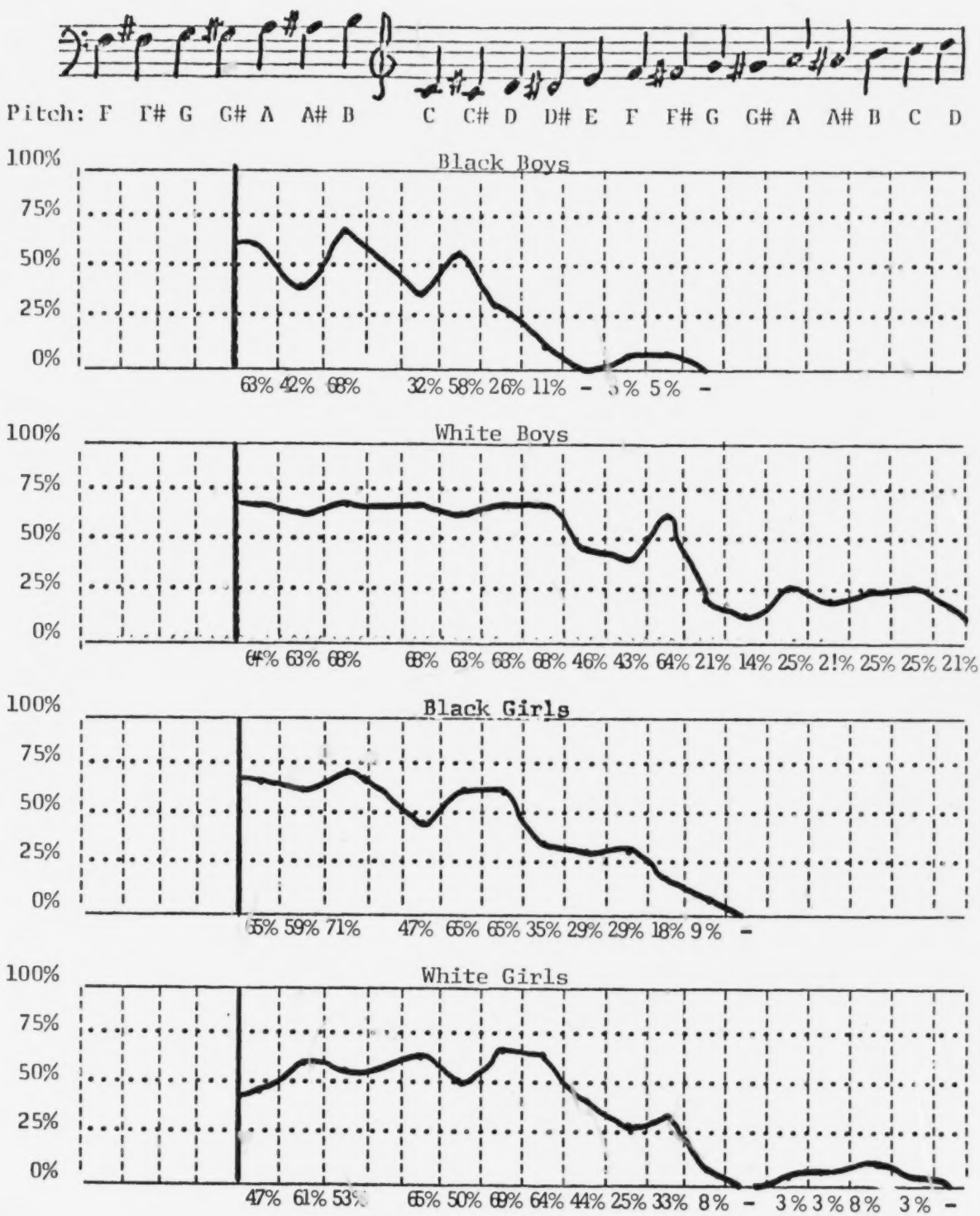


ILLUSTRATION SEVEN

ACCURATE VOCAL RANGE OF FIRST GRADE CHILDREN

case of black kindergarten girls, none of the pitches were reproduced with accuracy by any more than 34% of the group, but their best range appeared to lie between a and the c# above. It should be emphasized that the lower limit of the test extended to only a and since black children, in general, seem to have lower voices, it may well be that, had the test included pitches down to low F, the accurate range of black children might have proved to be more extensive.

The overall conclusion from these data is that, when accurate singing is the objective, teachers would be better advised to select songs of limited range and pitch them so the tessatura of each song remained below the range of the treble staff. If, on the other hand, voice range development was the objective, songs which contained higher pitches would be appropriate.

In the case of first grade children, the lower range also appears to be the area within which the most accurate singing is accomplished. For black first grade boys, this range appeared to be low a to the c-sharp above; for black first grade girls, from low a to d. For white first grade boys, the range of accuracy was between low a and f-sharp and for white first grade girls, from low a to e. As with kindergarten children, it appeared that the most accurate singing would be possible immediately below the treble staff.

As stated, black children's voices seem to be centered noticably lower than comparable aged white children. Another phenomenon occurred which further substantiates this thinking.

Many of the first grade black children, although unable to accurately sing the criterion pitch, as presented, were able to sing the same melody an octave lower. This happened with sufficient frequency to discount the possibility that it was due solely to chance. A substantial number of these children preferred to sing all of items 5,6, and 7 an octave lower than presented, which resulted in their singing some of the same pitches that they had sung in items 1 through 4. This appeared to be desirable for many since, in order to sing the upper pitches of the test, a falsetto type voice was often necessary. The children who tried this technique were obviously unaccustomed to using their falsetto voices and felt uncomfortable in doing so. In addition, due to the lack of control, accuracy was much less than when they used their natural voices. The implications of these data suggest that greater accuracy might result in the singing of black children if the songs employed were pitched within a range more suitable for their natural singing voices.

Voice range - Preferred Keys

In order to respond satisfactorily to items 1 through 7, it was necessary for the children to have some ability for musical perception. The item was played on a song bell set and sung to each child, but, to respond properly, it was necessary for him to hear the item correctly and then to be able to reproduce it vocally at the correct pitch level. Since inaccurate perception could

influence the results of this test, a second series of items was employed which involved less listening proficiency. A familiar song was selected ("Old MacDonald had a Farm") and each child was asked to sing the first line at the pitch level of his choice. This segment of the "MacDonald" melody contained a total range of a minor sixth, extending a major third above the starting pitch and a perfect fourth below. In most instances, the children began singing in keys suitable to their voice range. In a few cases, some children began too low for the bottom limits of their voice range, but only rarely did anyone start higher than they could manage the tune. Due to the restricted voice ranges of several of the subjects, as pointed out in previous sections, some of the intervals in this melodic segment were compressed, that is, rather than going down a full fourth, or up a major third, the children would substitute smaller intervals which they could sing for those that were out of their voice range. This, of course, is what happens in music classes where songs are employed which have a range which is too large for the voices of the children. Persistent employment of songs such as these will lead to intonation problems due to the child becoming accustomed to the sound of out-of-tune singing. When this happens, the problem is infinitely more difficult to correct.

The data for this portion of the test are displayed in Illustration Eight.

ILLUSTRATION EIGHT

KEY AREAS PREFERRED BY KINDERGARTEN AND FIRST GRADE CHILDREN

	Key Areas *					
	A & lower	B^b to C	D^b to E^b	E to F#	G to A	B^b & higher
Kindergarten						
Black Boys	.25	.37	.37	-	-	-
White Boys	-	.33	.54	.12	-	-
Black Girls	-	.55	.45	-	-	-
White Girls	-	.13	.60	.27	-	-
First Grade						
Black Boys	-	.63	.27	.10	-	-
White Boys	.04	.38	.42	.08	.08	-
Black Girls	.07	.76	-	.14	-	-
White Girls	-	.28	.62	.09	-	-

* Figures represent percentages of the total group.

It can be seen that black kindergarten boys equally preferred the key areas of B-flat to C and D-flat to E-flat. Black girls at this level seemed to prefer the same key areas with a slight majority favoring the B-flat to C level. This information agrees with that presented in earlier sections which indicated that black girls had somewhat lower voices than black boys. White children of both sexes seemed to favor the pitch level represented by the D-flat to E-flat key areas.

With first grade children, there appeared to be a decided preference for the B-flat to C key area in all black children while majority of white girls selected the D-flat to E-flat areas. White boys, following a tendency seen with white kindergarten boys, were about equally divided between the areas of B-flat to C and D-flat to E-flat.

Voice Range - Prescribed Keys

Since it was possible for children to start at a pitch lower, or higher, than they could successfully sing the entire "MacDonald" segment, still another series of items was administered. This time the children were asked to sing the same "MacDonald" segment but in a key prescribed by the examiner. They were first asked to sing, starting on the pitch f, which required a range of middle c up to second space a'. Following this, they were asked to sing the same segment again in E-flat, with a resulting total range of b-flat to g. A third performance was requested to complete the

series: "Twinkle twinkle little star" in E-flat, requiring a total range of e-flat to third space c'. After all three segments were completed, a rating of "1" was assigned to the key which appeared to be best suited for the child's range, "2" to his next best, and "3" to the one least suited to his vocal abilities. The data for these items are shown in Illustration Nine.

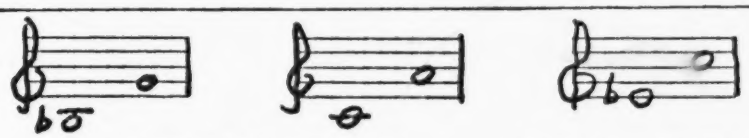
As can be seen, the "MacDonald" segment in E-flat (the lowest pitched of the three) was the best suited for all black children. The "Twinkle" segment was the least suited to these children in all cases. White children were not as clearly divided but a substantial majority of them seemed to perform best on the "MacDonald" segment in E-flat and least satisfactorily on the "Twinkle" segment. Once again the evidence indicates that all black children in kindergarten and first grade and most white children in these same grades perform most satisfactorily in lower pitched keys.

Developmental Patterns in Voice Range

One of the better ways of investigating child voice range development would be to conduct a longitudinal study of a group of children which involved periodic measurement of each child's vocal ability. In this manner, a systematic account of how children develop would result. The present study, while not of the longitudinal type, produced data which suggested specific patterns in the development of children's voices.

ILLUSTRATION NINE

RATINGS OF CHILDREN'S ABILITY TO SING
WITHIN THREE SELECTED TESSATURAS

Tessatura = 

Song Title	Old MacDonald Had a Farm in E-flat		Old MacDonald Had a Farm in F		Twinkle twinkle in E-flat	
% = proportion for which ea. song was best, 2nd, & least best.						
Kindergarten						
Black boys	Best	100%	Best	-	Best	-
	2nd	-	2nd	100%	2nd	-
	Least	-	Least	-	Least	100%
White boys	Best	71%	Best	17%	Best	23%
	2nd	11%	2nd	83%	2nd	-
	Least	17%	Least	-	Least	77%
Black girls	Best	100%	Best	-	Best	-
	2nd	-	2nd	100%	2nd	-
	Least	-	Least	-	Least	100%
White girls	Best	55%	Best	27%	Best	18%
	2nd	18%	2nd	69%	2nd	-
	Least	27%	Least	4%	Least	82%
First Grade						
Black boys	Best	100%	Best	-	Best	-
	2nd	-	2nd	100%	2nd	-
	Least	-	Least	-	Least	-
White boys	Best	82%	Best	25%	Best	18%
	2nd	18%	2nd	69%	2nd	-
	Least	-	Least	6%	Least	82%
Black girls	Best	100%	Best	-	Best	-
	2nd	-	2nd	100%	2nd	-
	Least	-	Least	-	Least	-
White girls	Best	86%	Best	11%	Best	11%
	2nd	7%	2nd	89%	2nd	-
	Least	7%	Least	-	Least	89%

For this analysis, the data were regrouped, based on the total number of pitches which each child accurately sang on items 1 through 7. The first group contained the data for those children able to perform five different tones, less. It was discovered that these pitches tended to center around two distinct and separate pitch areas. One occurred within a range of d to f# and the second between a and e-flat. The total number of children who sang within one of these groups constituted over 90% of the group. Of the remaining 10%, middle c up to f was sung by several, and ranges of c# to g, d to third line b, and d to a-flat' were favored by only a few.

Next the voice ranges of those children who were able to sing from 6 to 8 pitches were examined. This time, all children seemed to be within the pitch area a, or b-flat, up to f, or f#. Only one child deviated from this pattern; singing accurately from b-flat to g.

The third group contained the data for those children who were able to accurately sing up to eleven pitches. The bottom range for all but one child in this group was low a, or b-flat with a top limit of third line b'or third space c'. It should be noted that most children in this group evidenced an inability to sing all the pitches within this range. The most commonly missed tones were a' and b'-flat, the general area of the "voice break" discussed in a previous section.

The final data group included those children who could accurately

sing twelve or more separate chromatic tones. The great majority of these children sang in a range of low a to third space c' or fourth line d' with little or no evidence of a "voice break." While many children in this group failed to sing all the pitches within this area, the missed pitches did not seem to center on any particular tones, as was the case with the preceding group.

Based on the preceding data, the following "stages" in voice range development may be identified for the children in this study:

Stage One: Where the typical child sings in one of two general pitch ranges: (a) d to f#, or (b) a to e-flat.

Stage Two: Where a common pitch range of a to f# is sung by most children. Apparently, those who formerly sang in the d-f# range, developed in a downward direction while those who sang in the a to e-flat range developed upward.

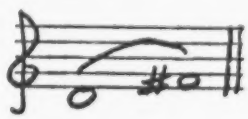
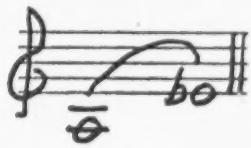
Stage Three: Where the upper range continues to develop. A typical child at this stage sings in the a to c' range but shows strong evidence of loss of control around a'or b'.

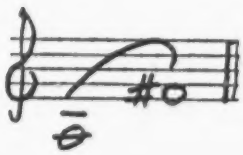
Stage Four: Where the voice break is brought under control and the upper range is extended to fourth line d'.

See Illustration Ten.

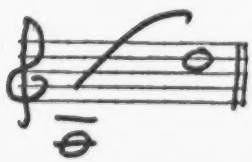
ILLUSTRATION TEN

STAGES IN THE DEVELOPMENT OF ACCURACY
IN CHILDREN'S VOICE RANGE AS IDENTIFIED IN THIS STUDY

Stage One:  or 

Stage Two: 

Stage Three: = voice break

Stage Four:  (no voice break)

Tonality Preference of Young Children

The pedagogical principles of both Carl Orff and Zoltan Kodály include the use of much song material based on the minor mode. Whether this is because the folk song material of the countries in which these men worked was often in the minor mode or whether the minor mode is, in fact, easier for children to sing has never been clearly determined. The fact that the descending minor third interval is by far the easiest for young children to sing, as both educators have repeatedly stated, has been supported by recent research. Whether this facility extends into whole phrases or songs has not been extensively investigated.

In order to determine the tonality preference of young children, six pairs of tonal patterns, identical in every respect, save in tonality, were included in the criterion test employed in this study. The data obtained for these items are shown in Illustration Eleven.

For the first analysis, only the scores of those children who were able to reproduce each pattern correctly, in its entirety were considered. As shown, five of the six paired patterns were sung more frequently in the major mode by kindergarten children. However, with first grade children, the major form was sung by more children in only three instances, the minor form in two instances, and the remaining example being sung by equal numbers of children in both major and minor forms.

While greater accuracy seems possible in the major mode for

ILLUSTRATION ELEVEN

ACCURACY IN SINGING COMPARABLE MAJOR AND MINOR MELODIES DISPLAYED BY KINDERGARTEN AND FIRST GRADE CHILDREN

Item	Grade	ND	Number of Correct Pitches 0	1	2	3	4	5	6	7
9	Kg.	14	65	4	7	10				
Min.	1st	6	62	8	8	16				
10	Kg.	26	44	5	2	23				
Maj.	1st	23	37	9	7	24				
11	Kg.	38	27	5	4	12	14			
Min.	1st	33	28	6	6	8	19			
12	Kg.	33	41	4	4	5	6	17		
Maj.	1st	17	40	-	-	6	6	31		
13	Kg.	52	17	6	4	2	7	12		
Min.	1st	34	29	4	2	-	7	24		
14	Kg.	41	23	5	4	6	1	7	2	11
Maj.	1st	35	23	7	2	6	6	6	3	12
15	Kg.	17	58	8	6	11				
Maj.	1st	13	53	7	17	11				
16	Kg.	25	39	10	7	19				
Min.	1st	19	32	9	4	36				
17	Kg.	28	30	6	4	8	24			
Maj.	1st	26	29	2	2	7	34			
18	Kg.	30	30	6	-	7	6	21		
Min.	1st	26	32	4	1	4	9	29		
19	Kg.	46	20	2	1	4	4	23		
Maj.	1st	34	32	1	1	4	4	24		
20	Kg.	43	19	6	5	4	-	13	4	6
Min.	1st	40	22	3	6	3	8	7	7	4

ND = Non-directional singer

* Figures represent actual numbers of children for each category, however, since there were an even 100 subjects in each grade level, the figures may also be interpreted as percentages of the total group.

kindergarten children, this was not as true for first graders. Moreover, the single pattern sung by more kindergarten children in the minor mode (Example 12/18) was not among those sung in minor by more first graders. In addition, the difference in the numbers of children able to sing accurately in major or minor was not sufficient to justify drawing conclusions from the data.

It was also noted that in several instances, children responded in the opposite modality from that in which the criterion was presented. Here again the evidence was somewhat inconclusive. The change most often effected by kindergarten children was from major to minor. On the other hand, first grade children changed minor patterns to major in more cases. As before, the actual differences between the number of children changing major to minor and the number changing minor to major were too small to be significant.

General Singing Ability - Some Observations

Some information relative to the general singing ability and vocal development of children can also be seen in Illustration 11. First, a substantial number of children proved to be non-directional singers, that is their responses did not follow the melodic direction of the criterion item. This is not entirely surprising since many of the children who participated in this study were from environments in which music was not an important factor. Further, a large proportion of these children had received little or no musical instruction in the schools they had attended. It was also

noted that the number of children in the non-directional category was considerably smaller for first grade than for kindergarten. This is probably due in part to the difference in maturity level of the children but is also attributable to the fact that a much larger proportion of the first grade students had received formal musical instruction than had been the case with the younger group.

It will also be observed that a large number of children scored in the 0 column. These children, although singing the correct melodic direction, failed to accurately reproduce the pitches in the criteria. Two types of singers are represented in this classification. The first might be termed an out-of-tune singer. This student will use a singing voice quality, perform the correct melodic direction but will typically compress the intervals in the melody. For example, item 9, which contained a major third and a minor third, might be performed as a major second and a minor second by the out of tune singer. If he began on the proper pitch, he would be credited with one correct pitch. If, on the other hand he failed to start on the proper pitch, he would sing all the pitches of the criterion incorrectly, and receive a score of 0.

The second type of singer represented in the 0 column was one who typically sang too low (although not in a speaking voice). Many children responded in this manner perhaps because the range of the criteria were beyond their vocal capabilities or perhaps because they had not yet developed accurate pitch perception and therefore, could not "find" the correct beginning pitch. Very often this type of singer would respond with some or all of the correct

intervals so that the result was actually a melodic transposition of the criterion. Those children who were able to perform a reasonably accurate transposed version of the criterion melody had apparently developed their melodic perception ability beyond the physical capabilities of their voices to reproduce what they heard.

An analysis of the responses of those children who accurately reproduced some but not all of the pitches in any given criterion revealed three principal factors at work. The first, mentioned in a preceding paragraph was the tendency for some children to compress the melodic intervals. Children who had this problem, seemed to display one or more of the following: insecurity, laziness, or vocal range restrictions which prevented them from singing as high, or low, as the criterion demanded.

The second factor appeared to be related to perception. Some children seemed to hear only the most prominent features of each melody, that is, the initial pitch, final pitch, highest, or lowest. Thus in item 11/17 the child might sing the first, second (also the highest) and last pitches but guess at the third, which he probably did not accurately perceive. This same kind of problem is sometimes encountered in language-reading and in both language and music must be eliminated before the child can develop accurate reading ability.

A third factor which influenced accuracy was more related to rhythmic perception. Children with this problem would fail to hear

the correct number of pitches in an item. Their responses would sometimes be delivered at the proper pitch level, and sometimes not, depending on the influence of factors such as those discussed in the preceding paragraphs. This problem of failure to perceive the correct number of pitches is an elementary phase of rhythmic development and is a prerequisite to accurate melodic development. As might be expected, children encountered the problem more frequently with the longer items of the test.

In summary, the children employed in this investigation were at various stages of singing ability development. These levels, or stages, may be identified for these children and may be true for other groups of children displaying comparable characteristics of age, maturity, environment, and training.

Stage One: The child in this stage of development habitually uses his speaking voice in stead of his singing voice. He may or may not perform the correct melodic direction and is always characterized by a very limited range of tones (usually 2 or 3).

Stage Two: The child at this stage of development will normally sing in a vocal quality but will not consistently perform the correct melodic direction.

Stage Three: This stage contains two different types of singers. (A) The child who sings at the proper pitch level but evidences intonation problems on some tones. (B) Alternatively, the child at this

stage may sing some or all of the intervals correctly but transpose the entire melody to a more comfortable key, usually lower.

Stage Four: At this stage the child will sing most or all of the melody accurately and at the correct pitch level.

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PART THREE: CONCLUSION

Limitations

Every psychological study is subject to limitations, the present investigation being no exception. One of the more obvious limitations of the present study concerned the population sample. While the number of children employed (200) was sufficient for statistical validity, they were all drawn from a single county in East Texas. This factor places a restriction on the possible application of the results to children and situations in other areas. The findings of this study may or may not be true of similar situations in other locations.

A second limitation concerned the home environments of the children who participated in the study. Due to various processes of selection, over which the investigator had no control, the public school kindergartens and the Headstart school contained children from disadvantaged environments who happened to be mostly black.

The private kindergartens, on the other hand, contained children from homes generally considered to be advantaged and these children were mostly white. Thus the make-up of the sample was biased, environmentally, in favor of white children, at the kindergarten level. At the first grade level this bias was not present since all kinds of home environments were represented in the classrooms tested.

A third limitation concerned the amount of musical training children had received in the various schools. At the kindergarten level this instruction ranged all the way from a specifically concept oriented music program, to some which included song singing with piano accompaniment, unaccompanied singing, and a few which had no music instruction other than some infrequent free listening to recorded music. At the first grade level, differences in music instruction were also present. One school provided music classes two or three times a week and another had no music instruction at all. These differences probably influenced to a degree some of the findings.

In spite of these limitations, a general cross-section of the population is represented in the sample of subjects. Some of all environments, children with differing musical aptitudes, and schools offering widely differing music programs were included. To the extent that these are representative of the population of this general area and occur in the proportions comparable to those of the actual total population, then the findings of this study are accurate and applicable to the general population.

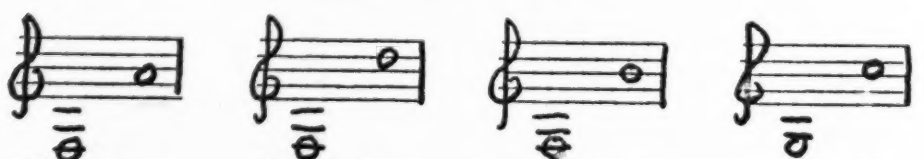
Findings

Within the limitations described, the following findings are presented:

1 Some differences exist in children's voice range which are identifiable with differences in sex, racial origin, and grade level. Children were classified into eight groups for data analysis. The maximum singing ranges of each group are shown:

Kindergarten Children

First Grade Children



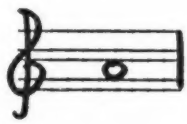
Based on the data, the following inferences may be made:

(A) Girls, in general, seem to possess lower pitched voices than boys.

(B) Black children, in general, seem to possess lower pitched voices than comparable white children.

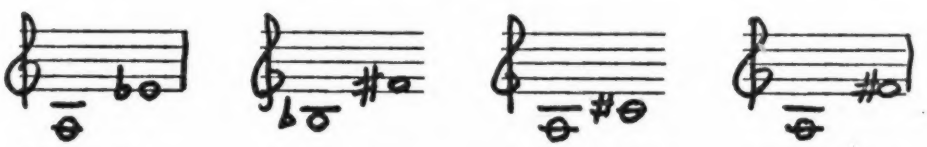
(C) White children, in general, have a wider singing range than comparable black children.

2. A commonly observed characteristic of children's voices is the occurance of a "break", or loss of control in the upper register. This break is most apparent in younger, or less mature,children and seems to occur most frequently on the pitch a'.



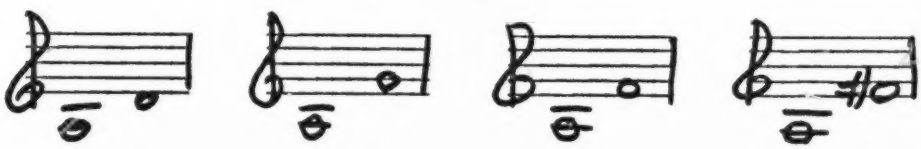
3. Some differences also exist in the level and extent of the <u>accurate</u> singing range of children. The region within which the most accurate singing was accomplished is shown for each group:

<u>Kindergarten Children</u>



Black boys White boys Black girls White girls

<u>First Grade Children</u>

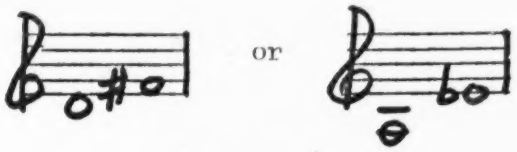


Black boys White boys Black girls White girls

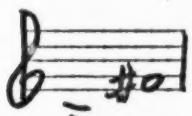
4. The data from this study did not support the contention that young children can more easily sing in minor than in major modalities. A larger, but insignificant, number of children seemed able to sing major melodies with accuracy than minor.

5. Children's voice range seems to expand in fairly identifiable stages. Those observed in this study are:

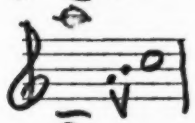
Stage One:



Stage Two:

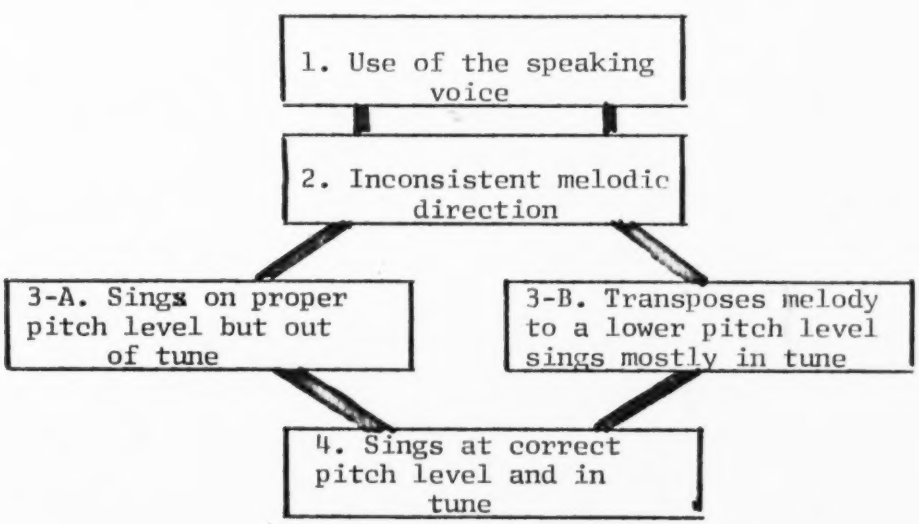


Stage Three:



Stage Four:

6. Children's singing ability also seems to develop in levels, or stages. Those found in this study are as follows:

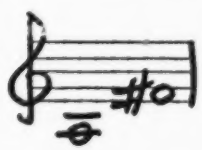

1. Use of the speaking voice
2. Inconsistent melodic direction
3-A. Sings on proper pitch level but out of tune
3-B. Transposes melody to a lower pitch level sings mostly in tune
4. Sings at correct pitch level and in tune

Conclusions

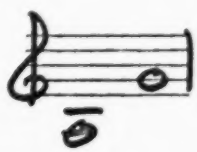
The following conclusions are based on the data. Interpretation of the conclusions should be done in the light of the limitations.

1. Accurate singing (singing in tune) is important and should be of primary concern to music teachers. To encourage this, the majority of songs used in kindergarten and first grade should be pitched so that their tessaturas (most frequently sung pitches) are within the following range.

For Kindergarten:



For First Grade:



2. The voice break does, indeed, exist in young children. Probably the best approach is to employ song material which leaps the voice break area and/or descends diatonically through it. Songs should not be employed which require the child to sing diatonically upward through the break area.

3. Teachers should be aware of the level of development of the children in their charge and choose music appropriate for for their specific needs.

4. Frequent observation or testing of each individual child should be done for the purpose of ascertaining each child's rate of development and his current status.

5. Teachers should not overlook the possibility that there may be differences in the vocal capabilities of children from

differing racial origins, between boys and girls, and in children of differing ages. Materials and opportunities should be provided so that all of these children may have the chance to succeed.

PERORATIVE

Every child has musical potential. Whether this potential is nourished, and developed, or whether it is allowed to wither and eventually dissipate, is largely up to the public school music teacher and the kinds of experiences she is able to provide for the children in her charge.

To effectively teach the children of today, the teacher must be aware of how children develop. She must be cognizant of the stages of development through which the child passes as well as the processes through which he learns. She must also be aware of the physical capabilities which the child possesses at any given age. Lastly, she must select and employ materials suited to these capabilities.

It is in the furtherance of these understandings that the true purpose of this, and similar research lies.

FOOTNOTES

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